THE ROLE OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES IN CREATING CHATBOTS IN THE UZBEK LANGUAGE

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Abstract: This paper investigates the function of artificial intelligence (AI) in creating Uzbek-language chatbots. It highlights the significance of natural language processing (NLP), the difficulties associated with languages that have limited resources, and the real-world uses of chatbots across various industries. Additionally, the research proposes future avenues for enhancing AI systems for the Uzbek language.

Keywords: artificial intelligence, chatbot, Uzbek language, NLP, digital technologies, corpus linguistics.

Introduction

In recent years, artificial intelligence has become an integral part of modern digital technologies. AI-based systems are widely used to automate tasks, enhance communication, and improve user experience. Among these systems, chatbots play a significant role in enabling interaction between humans and machines. They are used in customer service, education, healthcare, and many other areas.

The development of chatbots in widely spoken languages has achieved significant progress. However, for low-resource languages such as Uzbek, the development process faces several limitations. Therefore, studying the role of AI in Uzbek chatbot creation is both relevant and necessary.

Literature Review

Artificial intelligence and natural language processing have been extensively studied by scholars. According to Russell and Norvig (2021), AI systems simulate human intelligence processes, including learning and problem-solving. NLP, as a subfield of AI, focuses on enabling computers to understand and process human language (Jurafsky & Martin, 2023).

Bird et al. (2009) emphasize that NLP technologies rely heavily on linguistic data and annotated corpora. In the Uzbek context, Abdullayev (2021) highlights the lack of computational linguistic resources, which limits the development of intelligent language systems. Karimov (2022) also notes that the integration of AI into Uzbek language technologies is still in its early stages.

Methodology

This study uses qualitative analysis based on existing scientific literature and practical implementations of chatbot systems. The research focuses on identifying the main technological components of chatbot development and analyzing their applicability to the Uzbek language.

The Role of AI in Chatbot Development

Artificial intelligence technologies are the foundation of modern chatbot systems. NLP allows chatbots to process user input, recognize intent, and generate appropriate responses. Machine learning algorithms improve chatbot performance by learning from large datasets.

DOI: 10.5281/zenodo.20006735

Transformer-based models, introduced by Vaswani et al. (2017), have significantly improved language understanding. These models enable context-aware processing, which is crucial for meaningful conversations. AI technologies also support speech recognition, sentiment analysis, and multilingual capabilities.

Challenges in Uzbek Chatbot Development

Despite technological advancements, several challenges remain:

- **Lack of linguistic resources:** Uzbek language corpora are limited.
- **Insufficient annotated data:** Machine learning models require large datasets.
- **Dialect diversity:** Regional variations complicate language processing.
- **Morphological complexity:** Uzbek is an agglutinative language, making analysis more difficult.

These challenges reduce the accuracy and effectiveness of chatbot systems.

Applications of Uzbek Chatbots

Uzbek-language chatbots are increasingly used in various sectors:

- **Education:** providing learning assistance and automated tutoring
- **Banking:** customer support and transaction assistance
- **E-commerce:** product recommendations and customer interaction
- **Public services:** delivering government information

These applications demonstrate the growing importance of AI technologies in everyday life.

Future Prospects

To improve chatbot systems in Uzbek, several steps should be taken:

- Development of large-scale Uzbek language corpora
- Creation of annotated datasets
- Investment in national AI research
- Integration of modern deep learning models

These measures will enhance the quality and efficiency of Uzbek-language AI systems.

Conclusion

Artificial intelligence technologies play a crucial role in developing chatbots in the Uzbek language. While there are challenges related to data and linguistic resources, ongoing advancements in AI provide promising solutions. Strengthening Uzbek-language technologies will contribute to the language’s presence in the global digital space.

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